UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,842	09/18/2003	Jayant R. Kalagnanm	YOR920030280US1 (8728-638	4870

46069 7590 02/20/2008
F. CHAU & ASSOCIATES, LLC
130 WOODBURY ROAD
WOODBURY, NY 11797

EXAMINER	
FLEISCHER, MARK A	

ART UNIT	PAPER NUMBER
4143	

MAIL DATE	DELIVERY MODE
02/20/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/664,842	KALAGNANM ET AL.	
	Examiner	Art Unit	
	MARK A. FLEISCHER	4143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☒ Claim(s) *5* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on *18 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. This action is in reply to the Application filed on 18 September 2003.
2. Claims 1–20 are currently pending and have been examined.

Request for Information Under 37 CFR § 1.105

3. 37 CFR 1.105. Requirements for information.

(a)

(1) In the course of examining or treating a matter in a pending or abandoned application filed under 35 U.S.C. 111 or 371 (including a reissue application), in a patent, or in a reexamination proceeding, the examiner or other Office employee may require the submission, from individuals identified under § 1.56(c), or any assignee, of such information as may be reasonably necessary to properly examine or treat the matter, for example:

(i) Commercial databases: The existence of any particularly relevant commercial database known to any of the inventors that could be searched for a particular aspect of the invention.

(ii) Search: Whether a search of the prior art was made, and if so, what was searched.

(iii) Related information: A copy of any non-patent literature, published application, or patent (U.S. or foreign), by any of the inventors, that relates to the claimed invention.

(iv) Information used to draft application: A copy of any non-patent literature, published application, or patent (U.S. or foreign) that was used to draft the application.

(v) Information used in invention process: A copy of any non-patent literature, published application, or patent (U.S. or foreign) that was used in the invention process, such as by designing around or providing a solution to accomplish an invention result.

(vi) Improvements: Where the claimed invention is an improvement, identification of what is being improved.

(vii) In Use: Identification of any use of the claimed invention known to any of the inventors at the time the application was filed notwithstanding the date of the use.

(viii) Technical information known to applicant. Technical information known to applicant concerning the related art, the disclosure, the claimed subject matter, other factual information pertinent to patentability, or concerning the accuracy of the examiner's stated interpretation of such items.

1. This is a request that applicants provide the information identified above especially where emphasis added. If applicants have this information, then applicants are required, under the provisions of 37 CFR 1.56, to disclose the information to the Office.
2. Applicant is not required or being asked to conduct a search for information beyond applicants own immediate files. If Applicant does not have immediate knowledge of the information requested, then a statement that the information sought is unknown or not readily available to the. Applicant will be accepted by the office as a complete reply.
3. **Why the Request for Information is Reasonably Necessary:** Applicant likely may possess additional knowledge reasonably pertinent to the examination of this application. If so, please send only relevant and pertinent information to the Examiner. **Specifically, please send the Examiner information relating to the presentation by Inventors Jayant Kalagnanam, Gyana Parija and Monalisa Mohanty at the 2001 INFORMS Conference held in Miami, Florida on or about November 4 – 7, 2001 in addition to any other pertinent information.** Examiner

has information that on November 5, 2001 between 4:15PM and 5:45PM, the aforementioned inventors gave a presentation entitled: "Accepting Bids Under Uncertain Future Demands" and Examiner requires the material presented to properly examine the instant application.

4. **Information Requested of Applicants**: If Applicant possesses any of the information above, Applicant is required to send: publications of pertinent information as well as the dates of the aforementioned information. Note that publications include any presentation material relating to the aforementioned presentation including copies of slides, PowerPoint computer files, notes, talking points, **handouts** and the like.

Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 510, 515, 610. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance. Appropriate correction is required.

Specification

5. The disclosure is objected to because of the following informalities: On page 6, line 11 Applicant refers to "teachers". Examiner believes this is a typographical error and should read "teachings". Appropriate correction is required.

Claim Objections

6. Claim 5 is objected to because of the following informalities: The claim contains the phrase *estimating a forecast* which is redundant insofar as a forecast is *ipso facto* an estimate of some future value. In addition, the phrase *forecast of the realized demand* is oxymoronic in that 'realized demand' is a value certain and not amenable to a forecast. Examiner believes this is merely a typographical error and easily remedied. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim provides for *comparing the forecast and the planned sales volume* but does not specify how this comparison is to be made and is *prima facie* vague because the act of comparing is subjective and further implies only a human apprehension and assessment of relative values and there are no guidelines in the specification as to how this assessment is to be made.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

a) Determining the scope and contents of the prior art.
b) Ascertaining the differences between the prior art and the claims at issue.
c) Resolving the level of ordinary skill in the pertinent art.
d) Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 1, 2, 3, 5, 7–10, 15, 16, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmed (*A Multi-Stage Stochastic Integer Programming Approach for Capacity Expansion under Uncertainty*) in view of Bichler (*Applications of Flexible Pricing in Business-to-Business Electronic Commerce*).

Claims 1, 15 and 20:

Note that although the wording and structure of claims 1, 15 and 20 are slightly different, they have the same scope and so are addressed together. Ahmed, as shown, describes and /or discloses the following limitations.

- *A method for developing an optimal sales plan for multiple products with multiple price classes* (Ahmed, in at least page 7, lines 2 and 3 describes math-programming formulations involving "multiple demand families" and "multiple product families") a *contingent on different possible realizations of uncertain demand over multiple time periods* (Ahmed, in at least page 4, line 16 refers to "Multi-stage models extend two-stage stochastic programming models by allowing revised decisions in each time stage based upon the uncertainty realized so far." (emphasis added) and in the abstract therein "Using a scenario tree approach to model the evolution of uncertain demand [...] we develop a multi-stage stochastic integer programming formulation for the problem." (emphasis added) where the realized 'uncertainty' associated with 'uncertain demand' corresponds to *realization of uncertain demand* and the 'multi-stage' stochastic program corresponds to *multiple time periods.*) *with the objective of maximizing expected revenue over a constrained capacity, comprising:*

Ahmed does not specifically address the notion of *maximizing expected revenue,* but Bichler, as shown does. Bichler, in at least page 290, column 1 at the bottom, refers to "Revenue

management originated […] as the practice of controlling the availability and/or pricing of travel seats in different booking classes, with the objective of maximizing revenue and/or profits." (emphasis added) and later, on page 296, column 2, last paragraph, refers to the notion of expected values: "Bid pricing […] seeks a price that maximizes expected profit […]" (emphasis added) where 'maximizes expected profit' is analogous to *maximizing expected revenue*.

Ahmed, as shown, further describes and /or discloses the following limitations.

- *formulating a multistage stochastic program* (Ahmed on page 4, line 19, describes a "multi-stage stochastic program") *that generates a quantity of each of the multiple products to be sold in each of the multiple time periods and a recommendation for when realized demand for at least one of the multiple time periods exceeds a planned sales volume;*

Ahmed does not specifically address the limitation *that generates a quantity,* but Bichler, as shown does. On page 290, column 2, Bichler refers to *multiple products* for which a 'quantity' is recommended: "In general, it is possible to increase revenue by optimal allocation of the total quantity across multiple price classes." (emphasis added) and later on page 298, column 1 states "The [ ] process is complex since it involves multiple products […] sold […] characterized by different demands across the different products." (emphasis added) where 'optimal allocation' corresponds to *generates a quantity*. In addition, Bichler on page 291, column 1 at the bottom refers to "supply shortages". and thus corresponds to the situation where *realized demand ... exceeds [ ] planned sales volume*. Finally, Bichler refers to the notion of generating a sales recommendation over different time periods, to wit "[A] manufacturer needs to be able to generate an accurate ATP (available to promise) profile. Companies also need to be able to make real-time projections of the cost of providing these bundles." (emphasis added) and "In commodity spot markets, supply shortages are known to cause wild price fluctuations." where 'generate' also corresponds to *generates a quantity* and 'real-time projections' corresponds to a *recommendation* and 'supply shortages' corresponds

to the situation where *realized demand … exceeds [ ] planned sales volume*. Bichler further describes and/or discloses the following limitations.

- *estimating a likelihood that the realized demand for the at least one of the multiple time periods exceeds the planned sales volume* (Bichler, on page 299, column 2 states: "In the e-utility, dynamic pricing will probably apply when the estimated loads are much higher than predicted. […] The owner may wish to contract for a short-term "assured" burst to cover the requirements of the premium users. […] It may be possible for the service provider to estimate the frequency of such bursts, […]." (emphasis added) where the phrase 'higher than predicted' corresponds to *planned sales volume* and a 'burst' is the occurrence of demand exceeding predicted amounts, *e.g.,* sales volume exceeding demand, and 'estimate the frequency of' these 'bursts' corresponds to *estimating a likelihood* per the limitation. Finally, such demand bursts must *ipso facto* occur at *some* time period. Bichler on page 299, column 2 specifically refers to "fairly long time intervals")*;*
- *collecting realized order data for each of the multiple time periods* (Bichler, on page 298 in the figure illustrates a "Data Warehouse" and a set of "historical transactions" corresponding to the limitation.)*; and*

Ahmed, as shown, describes and/or discloses the following limitation.

- *executing the multistage stochastic program using the likelihood and the realized order data to generate a sales plan* (Ahmed, on page 4, line 3 states: "With the advent of stochastic programming and increased computational power, the use of scenarios to model uncertainties in planning models has become increasingly popular." (emphasis added) where the 'increased computational power' refers to *executing [a] stochastic program* on a computer. Further down on that page, Ahmed specifically refers to "Multi-stage models" that incorporate uncertainty to produce a *plan*.).

Note that Ahmed specifically refers to multi-stage stochastic programming models while Bichler, more generally, refers to a variety of decision problems where uncertainty is present. Such problems are ubiquitous and can involve many types of objective functions including, but not limited to, minimizing cost or maximizing expected revenue where the decision variables correspond to a 'plan' as indicated by both Ahmed and Bichler (both papers describe the output of the application of optimization techniques in terms of a 'plan'). Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the techniques and problem approaches described in Bichler with the multi-stage stochastic programming approach described in Ahmed and instead of applying it to capacity planning problems in the face of uncertain demand, it is applied to product sales planning problems in the face of uncertainty because this would utilize the benefits and power of the stochastic programming methodology to the case of multi-item, multi-stage sales planning problems.

Claim 2:

Ahmed/Bichler disclose and/or describes the limitations of claim 1. Ahmed does not specifically disclose and/or describe the following limitation, but Bichler, as shown does.

- *collecting realized order data comprises continuously collecting new realized order data* (Bichler refers to 'continuous' data collection on page 289, column 1-2: "Flexible pricing requires tight integration between the buy and sell sides, with the capability of real-time updates to key operational data flows." (emphasis added) where 'sell side[ ]' corresponds to *demand,* 'real-time updates' and 'operational data flows' together corresponds to *continuously collecting realized order data.*) *and using the likelihood and the new realized order data to generate a revised sales plan* (Bichler states on page 292, column 1, "If there is demand in excess of planned supply, […] a manufacturer that has real-time coordination capability with its suppliers can […] plan the desired configuration, […] and finally generate an asking price 'on the fly.'" (emphasis added) where the 'demand in excess' corresponds to *the likelihood* and

'plan the desired configuration' corresponds to a *sales plan* and 'generate …' corresponds to *using* the likelihood to generate a price, hence a plan including price and quantity.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the techniques and problem approaches described in Bichler with the multi-stage stochastic programming approach described in Ahmed and instead of applying it to capacity planning problems in the face of uncertain demand, it is applied to product sales planning problems in the face of uncertainty that entails continuous monitoring of order data because this would utilize the benefits and power of the stochastic programming methodology to the case of multi-item, multi-stage sales planning problems and incorporate the capabilities of real-time data updates and processing thereby enabling a more efficient sales management system.

Claim 3:

Ahmed/Bichler disclose the limitations of claim 1. Bichler further discloses the following limitation, *formulating a multistage stochastic program comprises formulating the multistage stochastic program using IBM OSL Stochastic Extensions* (Bichler on page 295, column 1 states: "In general, […] the amount to be procured from each supplier is a difficult optimization problem that is modeled as an integer program and solved using a commercial solver like IBM's Optimization Solutions Library (OSL)." (emphasis added).) Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify the teachings of Ahmed/Bichler and incorporate the application of software that solves the aforementioned types of problems because the availability of many software options allows facilitates the solutions of the types of problems the instant Application addresses.

Claim 5:

Ahmed/Bichler disclose and/or describes the limitations of claim 1. Ahmed/Bichler further disclose and/or describe the following limitation.

- *estimating a likelihood comprises estimating a forecast of the realized demand and comparing the forecast and the planned sales volume* (Bichler, on page 292, column 1 states: "If there is demand in excess of planned supply, [...]" (emphasis added) where the 'demand in excess...' corresponds to the comparison between 'demand' and another quantity. Bichler also states that "In typical supply-chain management, demand is [assumed] to be an external variable that needs to be forecasted." (emphasis added) hence refers to a *forecast of ... demand.* Bichler refers to sales volume: "The transaction volume is large and the suppliers provide volume discounts [...]" (emphasis added) where 'transaction volume' corresponds to a *sales volume.* Bichler does not specifically refer to *planned sales volume,* but does refer to *planned supply* as noted earlier.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed with that of Bichler because this would allow the stochastic programming methodology of Ahmed to be applied to a class of problems involving the *sale* of multiple products over multiple time periods as opposed to inventory management and capacity expansion and thereby enlarge the scope and applicability of stochastic programming methodology, and solve a larger class of decision problems.

Claim 7:

Ahmed/Bichler disclose and/or describes the limitations of claim 1. Ahmed does not specifically disclose and/or describe the following limitation, but Bichler, as shown does.

- *collecting realized order data comprises collecting realized order data from an Internet website* (Bichler, on at least page 289, column 2 states: "The final sell-side channel shown in Figure 1, direct Web-site sales, is basic to business-to-consumer (B2C) models." (emphasis added) wherein 'direct Web-site sales' corresponds to *collecting ... order data* since such web-based interfaces provide a mechanism for placing, hence collecting, orders.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed and Bichler because using modern internet technologies for gathering orders is an efficient and cost-effective means of doing business and facilitates the collection of order data, hence allows the methods of Ahmed to provide more accurate and timely data with which to generate forecasts and execute the aforementioned stochastic programming methodology.

Claim 8:

Ahmed/Bichler disclose the limitations of claim 1. Ahmed/Bichler do not specifically disclose *collecting realized order data comprises collecting realized order data from a point-of-sale terminal.* However, the Examiner takes **Official Notice** that it is old and well known in the e-commerce arts to utilize any number of order entry devices such as point-of-sale terminals. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed and Bichler because using modern internet technologies and other electronic communication systems for gathering orders is an efficient and cost-effective means of doing business and facilitates the collection of order data, hence allows the methods of Ahmed to provide more accurate and timely data with which to generate forecasts and execute the aforementioned stochastic programming methodology.

Claim 9:

Ahmed/Bichler disclose and/or describes the limitations of claim 1. Ahmed does not specifically disclose and/or describe the following limitation, but Bichler, as shown does.

- *collecting realized order data comprises collecting realized order data from a reverse auction* (Bichler, on page 289, column 2 states: "Therefore, many companies may have to implement a hybrid procurement strategy [...] for some portion of the anticipated demand, and use reverse auctions [...]" (emphasis added) where 'anticipated demand' corresponds to *collecting realized order data* and 'use reverse auction' corresponds to order data *from* a reverse auction. Note, the action of *procuring* must *ipso facto* involve creating sales demand for sellers, hence provide for

collecting [ ] order data. Bichler further refers to data collection on page 289, column 1-2: "Flexible pricing requires tight integration between the buy and sell sides, with the capability of real-time updates to key operational data flows." (emphasis added) where 'sell side[]' corresponds to *demand,* 'real-time updates' and 'operational data flows' together corresponds to *collecting realized order data.*)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed and Bichler because using modern procurement channels for gathering orders is an efficient and cost-effective means of doing business and facilitates the collection of order data, hence allows the methods of Ahmed to provide more accurate and timely data with which to generate forecasts and execute the aforementioned stochastic programming methodology.

Claim 10:

Ahmed/Bichler disclose the limitations of claim 1. Ahmed/Bichler do not specifically disclose and/or describe the following limitation, but Examiner takes **Official Notice** as disclosed and/or described below.

- *keeping a counter of the quantity of realized order data being collected* (Examiner takes **Official Notice** that it is old and well-known as well as commonplace in the software arts to track or monitor the number of specified events, items, or pieces of data that are computed, stored and/or collected.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the quantity of invention to combine the teachings of Ahmed and Bichler and utilize standard software programming techniques to track certain values, such as the *quantity of realized order data* because the collection of order data, and its quantities and associated values enables the methods of Ahmed and Bichler and thereby provide more accurate and timely data with which to generate forecasts and execute the aforementioned stochastic programming methodology.

Claim 16:

Ahmed/Bichler disclose the limitations of claim 1. Ahmed/Bichler do not specifically disclose and/or describe the following limitation, but Examiner takes **Official Notice** as disclosed and/or described below.

- *the trigger engine comprises a set of decision variables* (Examiner takes **Official Notice** that it is old and well-known as well as commonplace in the mathematical programming arts to employ the use of *decision variables* in 'decision problems'. Applicant admits on page 7 line 19 that "a trigger engine is provided that forecasts if the demand for any price class is significantly different from the allocation." (emphasis added) where the 'forecast' is a prediction of a significant difference. Applicant further states on line 21 that the engine is "used to determine [...]", hence, involved in solving a decision problem and thereby use *decision variables.*)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the techniques and problem approaches described in Bichler with the multi-stage stochastic programming approach described in Ahmed and incorporate some means for determining when a new plan must be computed. The stochastic programming techniques of Ahmed utilize recourse actions that can be applied depending on realized demand. Thus, use of decision variables to detect when significant differences arise in product sales planning problems enables the benefits and power of the stochastic programming methodology to the case of multi-item, multi-stage sales planning problems.

Claim 18:

Ahmed/Bichler disclose the limitations of claim 16 above. Ahmed also shows the limitations with respect to generating plans for *multiple products* in *multiple price classes* as per the rejections of the first limitations in claims 1, 15 and 20 above. Ahmed does not specifically disclose and/or describe the following limitation, but Bichler, as shown, does.

- *a profit function that accounts for total revenue for each of multiple products, wherein the profit function comprises* (Bichler on page 290 column 1 states: "Revenue

management originated in the airline industry as the practice of controlling the availability and/or pricing of travel seats in different booking classes, with the objective of maximizing revenue and/or profits." (emphasis added) where the 'objective' is an objective function that corresponds to *a profit function*.):

Ahmed further discloses and/or describes the following limitations.

- *a production constraint* (Ahmed on page 9 states: "Krarup [...] presented a formulation of (LSP) by defining Q_t as the quantity produced in period t to satisfy the demand in period $\tau = t, \ldots, T$." (emphasis added) hence corresponds to *a production constraint.);*
- *a demand constraint* (Ahmed on page 7 states: "Problem parameters α_t, β_t, h_t, and d_t represent the production cost, set-up cost, holding cost, and the demand in period t." (emphasis added) where in the associated math program the demand is within a constraint equation, hence serves as *a demand constraint.);*

Ahmed does not specifically disclose and/or describe the following limitation, but Bichler, as shown, does.

- *and a service level constraint* (Bichler, on page 300, column 1 specifically refers to *a service level*: "By standardizing the service classes (and possibly also the applications used by the premium service classes), the service provider may be able to develop robust statistical models for the bursting and thereby manage the capacity needed to meet the assured service levels." (emphasis added) where 'assured service levels' corresponds to a *service level constraint.*)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed with those of Bichler to model multi-stage and multi-item sales planning problems with variables and constraints described in the limitations because this facilitates the formulation of an appropriate math program thus rendering it amenable to solution using various stochastic programming software packages.

12. Claims 4, 6, 11–14, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmed/Bichler as applied to claim 1 and 10 above, and further in view of Santos (US 20020143665 A1).

Claim 4:

Ahmed/Bichler disclose and/or describes the limitations of claim 1. Ahmed/Bichler do not specifically disclose the following limitation, but Santos, as shown, does.

- *formulating a multistage stochastic program that generates a quantity of each product to be sold in each of the multiple time periods and a recommendation for pricing each of the multiple products* (Santos, in at least [0067], states: "The sell quantity [ ] indicates the recommended quantity of the product to be sold […]" (emphasis added) where the system and method of Santos generates the 'recommended quantity' 'to be sold' as per the limitation. Santos, in at least claim 17 further describes "multiple products". Santos, in at least [0037] also describes how multiple period data are handled: "In one embodiment, the EOL engine [ ] is a single period engine. Thus multiple period records defined in FORECAST.TXT are rolled into single period records for FORECAST.EOL." (emphasis added) where 'multiple period' corresponds to *multiple time periods.*)

Ahmed/Bichler further discloses and/or describes the following elements of the limitation. Ahmed, in the abstract, specifically refers to *multi-periods.* Bichler, on page 298, column 2, states: "[T]he output of the optimization engine is a set of […] recommended prices (or reserve prices for auctions) for each channel, […]." (emphasis added) where the 'output' corresponds to that which the *stochastic program…generates* and 'recommended prices' corresponds to *a recommendation for pricing* in the limitation. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed/Bichler with that of Santos because this would allow the stochastic programming methodology of Ahmed/Bichler to be applied to a class of problems involving the sale of multiple products over multiple time periods

and thereby enlarge the scope and applicability of stochastic programming methodology, and solve a larger class of decision problems.

Claim 6:

Ahmed/Bichler disclose and/or describes the limitations of claim 1. Ahmed does not specifically disclose the following limitation, but Bichler and Santos, as shown, do.

- *executing the multistage stochastic program using the likelihood to generate a sales plan comprises executing the multistage stochastic program using the likelihood to generate a sales plan for pricing each of the multiple products* (See the rejection of claim 4 where 'recommended prices' corresponds to a *sales plan* and that this applies to "multiple products" as per Santo claim 17. Bichler states on page 292, column 1, "If there is demand in excess of planned supply, [...] a manufacturer that has real-time coordination capability with its suppliers can [...] plan the desired configuration, [...] and finally generate an asking price 'on the fly.'" (emphasis added) where the 'demand in excess' corresponds to *the likelihood* and 'plan the desired configuration' corresponds to a *sales plan* and 'generate ...' corresponds to *using* the likelihood to generate a price, hence a plan including price and quantity.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed/Bichler with that of Santos because this would allow the stochastic programming methodology of Ahmed/Bichler to be applied to a class of problems involving the sale of multiple products over multiple time periods and thereby enlarge the scope and applicability of stochastic programming methodology, and solve a larger class of decision problems.

Claim 11:

Ahmed/Bichler disclose and/or describes the limitations of claim 10 above. Ahmed/Bichler do not specifically disclose the following limitation, but Santos, as shown, does.

- *comprising calculating a confidence level* (Santos, in at least [0080] states: "For example, mean, standard deviation, and covariance of the demands can be

estimated from the sales history of the same or related products." (emphasis added) where the 'standard deviation' is a necessary component for computing a confidence level and as this is estimated 'from the sales history' it corresponds to a standard deviation of the value disclosed in claim 10, the realized order quantity. Furthermore, Santos specifically notes use of a confidence level in [0082]: "Optimization of the selected business objective using the selected combinations of demand levels and associated probabilities will produce a result including an optimal raw material buy plan associated with a confidence level." (emphasis added) where the 'demand levels' leads to a 'confidence level'.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the quantity of invention to combine the teachings of Ahmed/Bichler with that of Santos and compute certain values, such as a *confidence level* because such values are essential elements of the aforementioned stochastic programming (SP) methodology, hence, enables the methods of Ahmed/Bichler and Santos thereby facilitates the application of the aforementioned stochastic programming methodology to the case of multi-item, multi-stage sales planning problems.

Claims 12 and 13:

Ahmed/Bichler/Santos disclose and/or describes the limitations of claim 11 above. Ahmed/Bichler/Santos do not specifically disclose and/or describe the following limitations, but Applicant's owns admissions do (see also Examiner's **Official Notice** as shown below).

- *if the counter is large, then calculating the confidence level using a normal distribution program.*
- *if the counter is not large, then calculating the confidence level using a gamma distribution program.* (Applicant on page 15, line 22 states that "The value of a "large" realized order data counter may vary depending upon implementation, as is known to those skilled in the art." (emphasis added). Applicant further notes that when such data are large, application of the normal distribution is appropriate whereas if data is not large, application of the gamma distribution is appropriate.

Examiner takes **Official Notice** that it is old and well-known as well as commonplace in the statistical arts to compute confidence intervals and levels using the aforementioned probability distribution functions for large and small sized data sets, respectively.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the quantity of invention to combine the teachings of Ahmed/Bichler with that of Santos and compute certain values, such as a *confidence level* using appropriate statistical methodology because such values are essential elements of the aforementioned stochastic programming (SP) methodology, hence, enables the methods of Ahmed/Bichler and Santos thereby facilitates the application of the aforementioned stochastic programming methodology to the case of multi-item, multi-stage sales planning problems.

Claim 14:

Ahmed/Bichler/Santos disclose and/or describes the limitations of claim 11 above. Ahmed/Bichler/Santos do not specifically disclose and/or describe the following limitations, but see Examiner's **Official Notice** as shown below).

- *estimating a confidence interval using the confidence level* (Examiner takes **Official Notice** that it is old and well-known as well as commonplace in the statistical arts that a *confidence interval* is computed *using a confidence level*).

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the quantity of invention to combine the teachings of Ahmed/Bichler with that of Santos and compute certain values, such as a *confidence interval* using appropriate statistical methodology because such values are essential elements of the aforementioned stochastic programming (SP) methodology, hence, enables the methods of Ahmed/Bichler and Santos thereby facilitates the application of the aforementioned stochastic programming methodology to the case of multi-item, multi-stage sales planning problems.

Claim 17:

Ahmed/Bichler disclose the limitations of claim 16 above. Ahmed also shows the limitations with respect to generating plans for *multiple products* in *multiple price classes* as per the rejections of the first limitations in claims 1, 15 and 20 above. Ahmed/Bichler do not specifically disclose and/or describe the following limitation, but Santos, in view of Examiner's **Official Notice,** as shown, does.

- *a variable indicating the planned sales volume* of one of *the multiple products in one of the multiple price classes* (Santos in at least [0055] states: "SellQty.sub.i is the quantity of product i to be sold." (emphasis added) where the phrase 'to be sold' indicates a *planned sales volume.*);
- *a variable indicating the quantity* of one of *the multiple products in one of the multiple price classes manufactured in a current time period to be sold in a next time period* (Santos, in at least [0026] states: "Demand forecasting is performed before manufacturing a new product." (emphasis added) where the 'demand forecasting' quantity corresponds to the amount to be manufactured and since this is done 'before manufacturing' it *ipso factor* corresponds to the amount to be *manufactured in a* current time period and *to be sold in a next time period.* Moreover, as Santos notes in [0078], "Demand realization triggers final assembly and sales corresponding to the second stage make and sell decisions. This multi-stage approach reflects the reality that purchase decisions frequently must be made well in advance of realization of the demand." (emphasis added) where the 'second stage' specifically corresponds to a later time period.); *and*
- *a variable indicating the quantity* of one of *the multiple products in one of the multiple price classes manufactured in the current time period to be sold in the current time period* (Examiner notes that this limitation is met by the rejection of the first limitation in that, depending on how long a given time period is and how it is defined, the aforementioned 'forecast' quantity can denote the amount of manufactured items to

be sold in the current *time period.* Moreover, Santos acknowledges that for some items, such as "[r]aw materials, for example, might take several weeks or months lead time for acquisition while assembly might take a few hours." (emphasis added) where 'a few hours' could correspond to the current time period and 'assembly' is a manufacturing process, hence yields a *quantity… manufactured in the current time period.*)

Examiner takes **Official Notice** that it is old and well-known as well as commonplace in the mathematical programming arts and specifically in the multi-stage stochastic programming arts to denote quantity variables for specified stages or time periods typically using notation involving subscripts. For example, Ahmed on page 9 states: "Krarup [...] presented a formulation of (LSP) by defining Q_{tr} as the quantity produced in period t to satisfy the demand in period $\tau = t, \ldots, T$." Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed/Bichler with those of Santos to model multi-stage and multi-item sales planning problems with variables denoting the quantities described in the limitation because this facilitates the formulation of an appropriate math program thus rendering it amenable to solution using various stochastic programming software packages.

Claim 19:

Ahmed/Bichler disclose and/or describes the limitations of claim 10 above. Ahmed/Bichler do not specifically disclose the following limitation, but Santos, as shown, does.

- *wherein the profit function further comprises an on-hand inventory constraint* (Santos, in at least [0062] states: "Gross profit is defined as follows: (revenue – inventory exposure - procurement investment + writeoff salvage value + ending inventory value of non - unique parts) ÷ gross profit" (emphasis added) where 'inventory exposure' is an *on-hand inventory constraint.*).

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the quantity of invention to combine the teachings of Ahmed/Bichler with that of Santos and incorporate on-hand inventory levels into a profit function because there strongly affect

profitability and are therefore essential elements of the aforementioned stochastic programming (SP) methodology, hence, enables the methods of Ahmed/Bichler and Santos to be applied to the case of multi-item, multi-stage sales planning problems.

Conclusion

Any inquiry of a general nature or relating to the status of this application or concerning this communication or earlier communications from the Examiner should be directed to Dr. **Mark A. Fleischer** whose telephone number is **571.270.3925.** The Examiner can normally be reached on Monday-Friday, 9:30am-5:00pm. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, **James A. Reagan** whose telephone number is **571.272.6710** may be contacted.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://portal.uspto.gov/external/portal/pair <http://pair-direct.uspto.gov >. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866.217.9197** (toll-free).

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to **571-273-8300**.

Hand delivered responses should be brought to the **United States Patent and Trademark Office Customer Service Window**:

Randolph Building

401 Dulany Street

Alexandria, VA 22314.

Mark A. Fleischer, Ph.D.
Patent Examiner/Mark A Fleischer/
Examiner, Art Unit 4143 13 February 2008
/James A. Reagan/Supervisory Patent Examiner, Art Unit 4143